The Impact of National Culture on Knowledge Sharing Activities in Global Virtual Collaboration: the Chinese Case

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ABSTRACT
This paper explores the impact of national culture on knowledge sharing activities in global virtual collaboration. In specific, the Chinese culture is examined.

Categories and Subject Descriptors
J.4 [**Computer Applications**]: Social and Behavioral Sciences - *Sociology*

General Terms
Management, Performance, Human Factors

Keywords
Knowledge sharing, global virtual collaboration, national culture, concern for face, language

1. INTRODUCTION
The knowledge-based view of the firm [1] emphasizes the importance of knowledge management in modern organizations. Knowledge sharing is a key process in knowledge management practices. Recent research on knowledge sharing has identified a variety of factors that lead to effective knowledge sharing, such as motivation [2] and culture [3], but few studies have focused on addressing knowledge sharing activities in different settings [4]. One interesting example is in virtual collaboration, especially in global virtual collaboration.

Knowledge sharing in virtual collaboration is different than in traditional face-to-face settings. By using ICT, virtual collaboration can facilitate knowledge sharing in terms of easily organizing diverse backgrounds of the knowledge workers and increasing accessibility to information and knowledge [5]. On the other hand, the geographic, temporal, organizational and/or cultural discontinuities [6] that may exist in virtual collaboration may create problems that can hinder knowledge sharing among team members.

One of the major barriers to knowledge sharing is cultural differences [7]. This problem is even more prominent in global virtual collaboration settings since the team members may come from different departments, organizations and/or different countries. Thus, different levels of culture may shape members' knowledge sharing behavior, but little research has explored the effect of cultural differences on knowledge sharing activities in virtual collaboration [8].

So to fill these gaps, I propose to study the impact of national culture on knowledge sharing in global virtual collaboration. In this research, I focused on one specific nation: the Peoples' Republic of China. Knowledge management research is usually done in the context of western countries or a specific developed country like Japan. Despite the fact that industries has been relocating from developed countries to low cost developing countries, little research has been done in a context of developing countries. China presents an extremely interesting example given its growing importance in global economics and its strong ability to receive foreign direct investment. More specifically, the U.S. culture was selected as the control culture given the important relationship between China and the U.S. in economic field. In other words, this research only focuses on the Chinese perceptions of the impact of Chinese culture on their knowledge sharing activities when they virtually work with the U.S. colleagues.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT
Knowledge sharing is defined as the exchange of task-related information, know how, and feedback regarding a product or procedure [9]. Literature review in the fields of knowledge sharing, global virtual collaboration and cross-cultural studies revealed that the existing research on cross-cultural issues in knowledge sharing activities in global virtual collaboration setting is limited.

Most research on cross-cultural studies uses value-based cultural dimensions such as Hofstede's [10] five dimensions, and has been mainly conducted at a single cultural level. Recently, researchers have argued that individual's behavior is influenced by different levels of culture ranging from supranational level through the national, professional, and organizational levels to the group level, and all these different cultures can influence individual's behavior simultaneously [11, 12]. As a result, culture must be measured at an individual level; after the individual level data is aggregated, it will be possible to assert whether a certain cultural characteristic is common to a certain culture or not [12].

After a careful examination of national cultural dimensions in literature, Terpstra and Sarathy's [13] eight dimensions [1] of national culture was chosen as a start to refine the relevant cultural factors in this research because it includes not only the value-based cultural factors but the non-value based cultural dimensions such as language and material culture, which have been also identified as important factors that impact individual behaviors in cross-cultural research [e.g. 3].

A field study conducted in 2006 was served as a basis for the development of the hypotheses used in this study[2]. Given the

[1] The eight dimensions are: technology and material culture, language, aesthetics, education, religion, attitudes and values, social organization and political life.

[2] Actually, the research described in this paper is the second phase of the researcher's dissertation. The first phase is to use an exploratory case study approach to explore how national

space limit, here will only briefly report the constructs that were identified for the survey. A description of the field study is provided in Appendix 1.

Three cultural factors (language difference, technology infrastructure and concern for face), three knowledge sharing activities (the preference for using different types of tools in terms of written-based and voice-based communication tools, participation in task-related and social-related communication) and two factors that impact individual's perceptions of concern for face (extraversion and adaptation to organizational culture) were identified from the case study. The relationships between these factors were further examined in the survey. The research model is presented in Figure 1. The hypotheses are illustrated below. Given the space limit, the rationale behind the hypotheses development is not explained here. Instead, it is provided in Appendix 2.

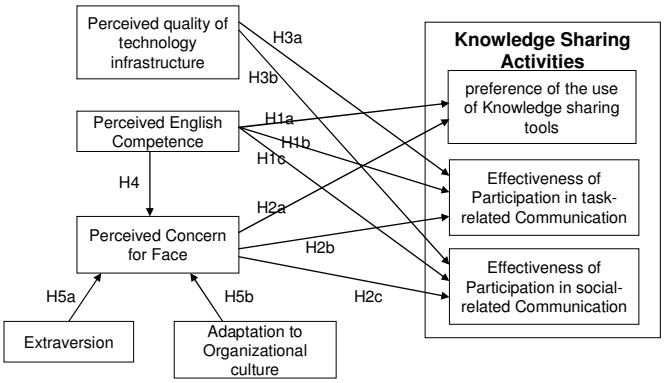

Figure 1. Research Model

H1a: The perceived English competence affects the preference for the use of different types of knowledge sharing tools in global virtual collaboration. The more competent one's English skills are, the less written based communication tools s/he would like use.

H1b: The perceived English competence positively affects the effectiveness of participation in task-related communication in global virtual collaboration.

H1c: The perceived English competence positively affects the effectiveness of participation in social-related communication in global virtual collaboration.

H2a: The perceived degree of concern for face affects the preference for the use of different types of knowledge sharing tools in global virtual collaboration. The more one concerns for face, the less voice based tools s/he would like use.

H2b: The perceived degree of concern for face negatively affects the effectiveness of participation in task-related communication in global virtual collaboration.

H2c: The perceived degree of concern for face negatively affects the participation effectiveness in social-related communication in global virtual collaboration.

H3a: The quality of technology infrastructure positively affects the effectiveness of participation in task-related communication in global virtual collaboration.

H3b: The quality of technology infrastructure positively affects the effectiveness of participation in social-related communication in global virtual collaboration.

H4: perceived English competence is negatively related to the perceived degree of concern for face.

H5a: Extraversion is negatively associated the perceived degree of concern for face in global virtual collaboration.

H5b: The degree of adaptation to organizational culture is negatively associated with the perceived degree of concern for face in global virtual collaboration.

3. METHOD

For this research, an online survey approach was applied. The instrument used in the survey includes items gathering demographic information of the respondents and items measuring the research constructs implied in the research model. The measures for the constructs in the research model were adapted from those validated in prior studies with minor wording changes made to incorporate the context of global virtual collaboration. The survey instrument was translated into Chinese and pre-tested before the final administration. The subjects were recruited from Chinese individuals who work in an American company in China and have had virtual collaboration experiences with the Americans. A small number of incentive prizes were provided to encourage participation. Partial Least Squares (PLS) were used to analyze the survey data.

4. RESULTS

In total, the final sample consists of 63 valid responses. SmartPLS [3] was used to analyze the final data. Measurement model and structural model were assessed. The measurement model was assessed in terms of reliability and validity. In summary, the measurement model was found to be effective. Given the space limit, here I will only report the results for the hypotheses testing, which are depicted in Figure 2 and summarized in Table 1.

culture impact knowledge sharing activities in global virtual collaboration and what kind of other factors that may mediate the impacts. The purpose of the case study is to understand the research questions qualitatively and generate a set of hypotheses, which can be tested in phase two.

3 Ringle, C.M./Wende, S./Will, S.: SmartPLS 2.0 (M3) Beta, Hamburg 2005, http://www.smartpls.de.

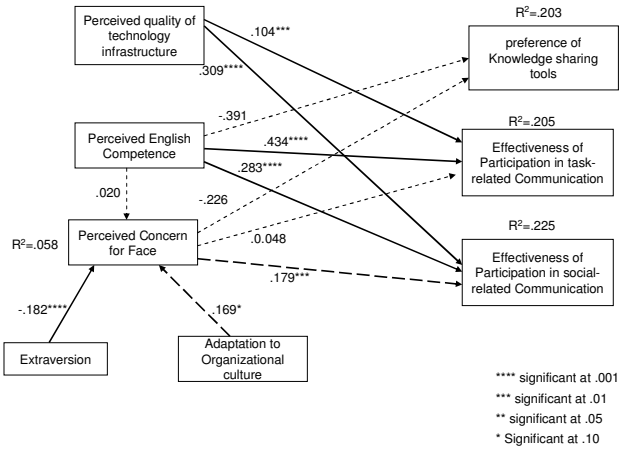

Figure 2. Results of PLS Analysis

Table 1. Results of Hypothesis Testing

H	Path coefficient	T value	Result
H1a	-0.391	1.375	Not Supported
H1b	0.434	10.344	**Supported**
H1c	0.283	6.330	**Supported**
H2a	-0.226	1.142	Not supported
H2b	0.048	0.645	Not Supported
H2c	0.179	3.066	Not supported (Significant but in opposite direction)
H3a	0.104	2.632	**Supported**
H3b	0.309	8.189	**Supported**
H4	0.020	0.373	Not supported
H5a	-0.182	4.999	**Supported**
H5b	0.169	1.896	Not supported (Significant but in opposite direction)

5. DISCUSSIONS

In this survey, I examined the relationships between Chinese cultural factors and knowledge sharing activities in global virtual collaboration with the Americans. Generally, hypotheses regarding the impact of language and technology infrastructure were supported. Language was found to be the strongest factor that influences knowledge sharing activities. However, hypotheses regarding concern for face were not supported, and the results showed mixed results for participation effectiveness in task-related vs. social-related communication. In the following section, I provided discussions for these interesting findings.

As expected, there was a significant negative impact of extraversion on concern for face. However, none of the hypotheses regarding the impact of concern for face on knowledge sharing activities was supported. Further, concern for face was found to have a reverse hypothesized relationship with participation effectiveness in social-related communication (H2c). While it might be difficult to understand at a first glance, a plausible explanation does exist for such observations, which rely on a deeper examination of the concept of the "concern for face" itself.

Face is "the respect, pride, and dignity of an individual as a consequence of his or her social achievement" [14 p.1575] . People try to enhance his or her face or try to avoid losing his or her face to gain respect and recognition from others [15]. So usually there are two behaviors related to concern for face: face gaining behavior and face saving behavior. Saving face does not necessarily mean gaining face, because face could only be gained through others' recognition and admiration [16]. Hwang et al. [17] propose that people would behave differently towards face saving and face gaining. For example, by surveying 159 MBA students in a major university in eastern China, Huang and her colleagues [16] found that face saving behavior has a negative relationship with the intention to share knowledge, while face gaining behavior has a positive relationship with the intention to share knowledge. Chu [18] argues that if people intends to save face, they will restrict their behavior as much as possible, or even avoid to contact with other; but for gaining face purpose, people will engage in self expression and showing one's merits actively.

Now return back to the results of this research. A possible explanation for the results regarding the impact of concern for face is that people, at least in the surveyed sample, care more about face gaining than face saving. In other words, people's concern for "face" leads more face gaining behaviors than face saving behaviors, which might be true in a competitive environment such as a multinational company in China. In such companies, people need to be recognized in order to gain various opportunities such as salary raise and promotion. So in this way, the more people care about their face, the more they would like to gain face, so they would participate more effectively in social related communication, because that is the way how they can express themselves to others.

Similarly, the face gaining inclination can also explain why people who are more adapted to organizational culture tend to concern more about their faces. In this research, the organizations where the respondents work are supposed to have an open, direct and a competitive culture. Under the influence of this type of the organizational culture, people are more likely to concern about face gaining, so the more they are adapted to the organizational culture, the more they will concern for face.

In this research, three factors were investigated to study their impact on participation effectiveness in task related and social related communication: the quality of the technology infrastructure, language and concern for face. The results found that both language and the quality of the technology infrastructure show significant positive impacts on participation effectiveness in both task related and social related communication with higher coefficients on the latter. Concern for face only showed significant impact on participation effectiveness in social related communication. These results can be explained from the different communication requirement between social-related knowledge and task-relate knowledge. In the interviews, the interviewees mentioned the difference between sharing social-related and task-related knowledge. They pointed out that social-related knowledge is more context-based, and it often comes with more

idioms, faster talking speeds, and use of different tones. So sharing social knowledge has a higher requirement for language and the quality of technology infrastructure. With them, people are willing to participate in the social-related communication because it helps them to understand what others say more clearly and keep the conversation smoothly.

6. IMPLICATIONS

This research has both theoretical and practical implications. Theoretically, this work bridges the gap between knowledge sharing, virtual teams and national culture research. Another theoretical implication is to introduce a distinction between national culture and national culture-in-practice. Most research on national culture treats culture as a static construct or a stable disposition of actors. It assumes that everybody in a specific culture should behave in a same way. But in practice, national culture is not functioning alone. Data analysis of this research finds that the impact of national culture on individual's behavior is much more dynamic. It impacts actors' behaviors together with a variety of other factors such as organizational culture and individual characteristics. In this way, individual's understandings of national culture, especially cultural values, are shaped by these factors and are reinforced or modified by actions as actors engage in practice.

The results also have practical implications for managers and team members. Research has found that though managers have realized the importance of culture, they find it is difficult or even impossible to "articulate the culture-knowledge relationship in ways that lead to action" [7]. One purpose of this research is to explore the relationships between national culture and knowledge sharing activities. The results of this study can therefore provide guidelines for managers and virtual team members to manage culture and technology to foster knowledge sharing activities in virtual settings, which in turn will improve team effectiveness.

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Appendix 1. Brief Description of the Case Study

The case study was conducted in a Chinese site of a knowledge-intensive global corporation. English is the working language. A technical support engineering team located in the site was selected for the study, which is from an IT department. The team has 21 employees (and other than the two American senior managers, all are Chinese). Most of the Chinese engage in a lot of collaborative work with U.S. colleagues. These Chinese are the main research subjects of this study. The researcher spent three months in the site as an intern from June 2006 to September 2006, which gave the researcher opportunities to attend the team meetings, observe team members' daily work style, and interview with them formally and informally. Content analysis was used to analyze the data from direct observation, documentation review and interviews. A set of hypotheses were developed from the case study.

By synthesizing literature, previous research in the corporation and the results of informal interviews with team members, four cultural dimensions were identified for the interview protocol: language, education, technology and material culture, and attitudes and values. In this study, the perception of language impact was captured by asking team members how they feel by using English to communicate with their American colleagues. Chinese workers mainly communicate with their U.S. colleagues through ICT, so technology infrastructure and its use were chosen as the indicator of "technology and material culture" in the interview protocol. Since this research focuses on knowledge sharing happened in workplace, technical knowledge one has had as a result of education was selected as the indicator of "education". Concern for face was chosen as the indicator of "attitudes and values", which is because this research studies the impact of national culture on knowledge sharing from Chinese perspective and concern for face is very deep rooted and influential in China. The interviews focused on explore the Chinese individual's perceptions of the impact of these cultural factors on knowledge sharing activities in global virtual collaboration.

Appendix 2. Hypotheses Development

In the following section, I describe each empirically generated insight from the case study, seek evidence from previous literature to explain and validate the analysis, and then propose specific hypotheses concerning the relationships between cultural factors and knowledge sharing activities.

Language

It is evident that there are big differences between the two languages (Chinese and English) themselves. What interests the researcher is the fact that, since English is used as the working language in the organization, how the Chinese individual's perceptions of their English competence affect knowledge sharing activities? Indeed, when asked about how using English as the official language influenced their knowledge sharing activities with American colleagues, all interviewees talked about the problems created due to their English reading, writing, listening and speaking skills. This observation regarding language difference is consistent with that of Ford and Chan [3] research. By studying the impact of national culture on knowledge sharing in a multicultural setting, Ford and Chan found that language differences in terms of individual's proficiency in different languages and willingness to learn a different language can create knowledge blocks that prevent knowledge from flowing effectively within an organization. So in this study, English competence is examined.

First, from the case study, we can see that individual's English competence affected his or her selection of knowledge sharing tools. As several members mentioned, they preferred reading and writing English because in that way, they had more time to think about and organize their thinking in English before communicate with American colleagues. But in occasions that need to speak English such as in meetings, they usually felt more difficulties in catching up others' speaking and expressing themselves clearly.

Previous research on language differences also reflects this observation. For example, in an exploratory investigation of communication in global product development teams, McDonough et al. [19] found that Language differences create the need for written-asynchronous communication because it allows interacting parties to take more time to interpret and process the information exchanged.

Second, perceived English competence was also found to affect participation in knowledge sharing communications, especially when using verbal-synchronous communication tools. As the interviewees mentioned, their English listening skills sometimes prevented them from understanding others well. They could not go back to the context easily once they got lost during telephone meetings. They sometimes could not use English to express the full ideas they would otherwise in Chinese. Another important factor the interviewees mentioned was that the limitations of using English to exchange social knowledge had made their meetings dry and boring, which in turn had impacted the communication. All these had a big negative impact on their communication with the American colleagues.

This observation is supported by research demonstrating how language differences shape communication [20]. Harzing and Feely [21] use socio-linguistic theory to demonstrate how language barrier creates communication misunderstandings in HP-subsidiary relationships.

As a result, the following hypotheses are proposed:

H1a: The perceived English competence affects the preference for the use of different types of knowledge sharing tools in global virtual collaboration. The more competent one's English skills are, the less written based communication tools s/he would like use.

H1b: The perceived English competence positively affects the effectiveness of participation in task-related communication in global virtual collaboration.

H1c: The perceived English competence positively affects the effectiveness of participation in social-related communication in global virtual collaboration.

Perceived Concern for Face

In the Chinese team members' opinions, the American colleagues were less concerned for faces. They were much opener and more direct. Among Chinese members, the perceived degree of concern for face was quite diverse. Some members perceived themselves concerned very much for their or the others' faces, so they did not initiate questions in order to protect their faces; While some others perceived themselves less concerned for face, so they were actively involved in the discussions and were not afraid of losing faces. So here the perceived degree of concern for face affects the participation in knowledge sharing communications. Another consequence from concern for face is that for those members who are more concerned for their faces, they prefer using asynchronous tools to communicate. The reason for that is, as I stated earlier, by doing so, they had more time to think about and organize their thinking in English before communicate with American colleagues. In that way, they kind of protected their faces to some extent. Some other members mentioned a correlation between their English competence and their degree of concern for face. They mentioned that they did not participate actively in a meeting because they did not want to lose their faces by speaking English badly.

Some cross-culture research, especially those that include Chinese culture, has somehow touched the relationship between concern for face and knowledge sharing activities qualitatively in different organizational settings. These findings support the above observation. From an in-depth case study of Siemens ShareNet in China, Voelpel and Han [22] conclude that ''concern for face'' is one of the two cultural aspects that negatively influence Chinese employees' knowledge-sharing behavior. They further point out that, employees who are highly sensitive to "face saving" and feel bad about their English abilities are reluctant to share knowledge actively.

Hence, I propose:

H2a: The perceived degree of concern for face affects the preference for the use of different types of knowledge sharing tools in global virtual collaboration. The more one concerns for face, the less voice based tools s/he would like use.

H2b: The perceived degree of concern for face negatively affects the effectiveness of participation in task-related communication in global virtual collaboration.

H2c: The perceived degree of concern for face negatively affects the effectiveness of participation in social-related communication in global virtual collaboration.

H4: perceived English competence is negatively related to the perceived degree of concern for face.

Quality of Technology infrastructure

Technology infrastructure refers to the basic utilities like power, telephone and cable that make possible the communication technologies upon which global virtual teams rely [23]. In this case, technology infrastructure was found no effect on their knowledge sharing activities. Most interviewees thought there was no difference on technology infrastructure between their work site and the U.S. site. Two reasons might be used to explain this observation, as I stated earlier: the first is that the Chinese site is located in the eastern China, where is rich and has built reliable technology infrastructure. The other reason is that in this organization, major international sites mirror the size of the U.S. sites with their large campuses of multiple buildings, and the architecture is standard from building to building. Without these two specifications, the results might not be the same.

Although little research has empirically studied the impact of technology infrastructure on knowledge sharing activities, a few studies have touched the relationship between the quality of technology infrastructure and communication qualitatively to some extent. For example, Riopelle and colleagues [23] demonstrate how the reliability of electrical power and telephone circuit reliability in different countries impact communication quality in a case study of six global virtual teams.

Hence, I propose the following hypothesis regarding the impact of the quality of technology infrastructure on knowledge sharing activities:

H3a: The quality of technology infrastructure positively affects the effectiveness of participation in task-related communication in global virtual collaboration.

H3b: The quality of technology infrastructure positively affects the effectiveness of participation in social-related communication in global virtual collaboration.

The very different perceptions of the degree of concern for face from different individuals indicate that it was most likely influenced by other factors. Two antecedents were found from the case study, which are associated with the perceived degree of concern for face. They are extraversion and the degree of adaptation to the organizational culture.

Extraversion

First, the very different perceptions of concern for face from different individuals indicate that this factor might be affected by individual characteristics. Indeed, the word "shy" often came together with "concern for face" during interviews. Some interviewees mentioned they were those persons that straight and open and did not care much about what others said, so they cared less about faces. Extraversion is found to be extremely relevant in this study, which is described as assertive, active, talkative, upbeat, energetic, and optimistic.

Adaptation to organizational culture

Second, the results of the case study also revealed the important role of organizational culture in shaping individual's perception of the degree of concern for face. So we can expect that, team members who are more adapted to the corporate culture, are more likely to behave in an open and direct way, which is what the corporate culture advocates. Thus, they are more likely to perceive less degree on concern for face.

Little research has explored the impact of organizational culture on national culture in individual's activities, but some researchers have realized that existing culture research has been mainly conducted at a single cultural level, and begun to study the joint effect of different levels of culture theoretically [11, 12].

Hence, I propose:

H5a: Extraversion is negatively associated the perceived degree of concern for face in global virtual collaboration.

H5b: The degree of adaptation to organizational culture is negatively associated with the perceived degree of concern for face in global virtual collaboration.